

Deliwala 500301D5

IN THE CLAIMS:

Please amend the pending claims as follows:

1. - 11. *cancelled*

12. (*currently amended*) An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising

~~an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide~~ formed in a portion of the upper silicon layer; and

a waveguide mirror formed in the upper silicon layer, wherein the waveguide mirror is formed at least in part by etching the upper silicon layer of the SOI wafer.

13. (*previously added*) The optical device of claim 12, wherein the optical device includes an input/output light coupler, the optical waveguide including a cladding, and the input/output light coupler including an evanescent coupling region that is at least partially formed from the same material as the cladding.

14. (*previously added*) The optical device of claim 13, wherein the evanescent coupling region and the cladding portion are at least partially formed of glass.

15. (*previously added*) The optical device of claim 13, wherein the evanescent coupling region and the cladding portion are at least partially formed of a polyamide.

16. (*previously added*) The optical device of claim 15, wherein the optical device includes a hybrid active electronic and optical circuit, wherein an electric insulator is also sued to partially define an active electronic circuit in a hybrid active electronic and optical circuit.

17. (*previously added*) The optical device of claim 12, wherein altering an electric voltage applied to an active electronic circuit on the wafer affects a free carrier distribution associated with the optical device, and thereby changes the effective mode index of the optical device.

18. (*previously added*) The optical device of claim 12, further comprising an active electronics portion that is located proximate a channel portion, in which electricity can be selectively applied to a region outside of the channel region to control the

Deliwala 500301D5

electromagnetic state of the channel portion in a manner that can effect light traversing the channel portion.

19. *(previously added)* The optical device of claim 18, wherein the active electronics portion combines with the channel portion to act as one from the group of a modulator, a deflector, a diode, and a transistor.

20. *(previously added)* The optical device of claim 19, further comprising a passive optical portion, wherein the passive optical portion and the active electronics portion are fabricated simultaneously to form a hybrid active electronic and optical circuit at least partially in the upper silicon layer.

21. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is configured to provide total internal reflection.

22. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is configured as an off-axis paraboloid.

23. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is configured as a beamsplitter to separate a single incident beam into a plurality of output beams.

24. *(previously added)* The optical device of claim 12, wherein the optical device includes one from the group of a p-n device a field plated device, a Schottky device, a MOSCAP, and a MOSFET.

25. *(previously added)* The optical device of claim 12, further comprising a channel formed in the waveguide, wherein the waveguide mirror focuses light into the channel.

26. *(previously added)* The optical device of claim 12, wherein the waveguide mirror is included as a portion of a waveguide Fabry-Perot cavity.

27. *(currently amended)* The optical device of claim 12, wherein the waveguide mirror is included as a portion of an arrayed waveguide (AWG).

28. *(previously added)* The optical device of claim 12, wherein material removed to form the waveguide mirror during said etching does not fully extend through the upper silicon layer.

29. *(previously added)* The optical device of claim 12, wherein the upper silicon layer is less than or equal to 10 microns thick.

Deliwala 500301D5

30. *(previously added)* An optical device formed at least partially in a wafer, the optical device comprising:

an upper silicon layer formed in the wafer, the upper silicon layer at least partially forming a waveguide; and

a waveguide mirror formed in the upper silicon layer, wherein the waveguide mirror is formed at least in part by etching the upper silicon layer of the waveguide.

31. - 32. *cancelled*

33. *(currently amended)* An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising:

~~an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide~~ formed in a portion of the upper silicon layer; and

a glass layer formed across at least part of the upper silicon layer;

a waveguide mirror ~~functioning~~ disposed in the upper silicon layer and formed at least in part by etching the glass layer.

34. *(currently amended)* An optical device formed at least partially in a wafer, the optical device, comprising:

an upper silicon layer formed on the wafer, the upper silicon layer at least partially forming a waveguide;

a glass layer formed across at least part of the upper silicon layer; and

a waveguide mirror ~~functioning~~ disposed in the upper silicon layer and formed at least in part by etching the glass layer.

35. - 36. *cancelled*

37. *(currently amended)* An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising:

~~an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide~~ formed in a portion of the upper silicon layer; and

Deliwala 500301D5

a waveguide lens formed in the upper silicon layer, wherein the waveguide lens is formed at least in part by etching the upper silicon layer of the SOI wafer.

38. *(previously added)* The optical device of claim 37, wherein the optical device includes an input/output light coupler, the optical waveguide including a cladding, and the input/output light coupler including an evanescent coupling region that is at least partially formed from the same material as the cladding.

39. *(previously added)* The optical device of claim 38, wherein the evanescent coupling region and the cladding portion are at least partially formed of a glass.

40. *(previously added)* The optical device of claim 38, wherein the evanescent coupling region and the cladding portion are at least partially formed of a polyamide.

41. *(previously added)* The optical device of claim 40, wherein the optical device includes a hybrid active electronic and optical circuit, wherein an electric insulator is also used to partially define an active electronic circuit in a hybrid electronic and optical circuit.

42. *(previously added)* The optical device of claim 37, wherein altering an electric voltage applied to an active electronic circuit on the wafer affects a free carrier distribution associated with the optical device, and thereby changes the effective mode index of the optical device.

43. *(previously added)* The optical device of claim 37, further comprising an active electronics portion that is located proximate a channel portion, in which electricity can be selectively applied to a region outside of the channel portion to control the electromagnetic state of the channel portion in a manner that can effect light traversing the channel portion.

44. *(previously added)* The optical device of claim 43, wherein the active electronics portion combines with the channel portion to act as one from the group of a modulator, a deflector, a diode, and a transistor.

45. *(previously added)* The optical device of claim 44, further comprising a passive optical portion, wherein the passive optical portion and the active electronics portion are fabricated simultaneously to form a hybrid active electronic and optical circuit at least partially in the upper silicon layer.

Deliwala 500301D5

46. *(previously added)* The optical device of claim 37, wherein the waveguide lens is configured to provide total internal reflection.

47. *(previously added)* The optical device of claim 37, wherein the waveguide lens is configured as a beamsplitter to separate a single incident beam into a plurality of output beams.

48. *(previously added)* The optical device of claim 37, wherein the optical device includes one from the group of a p-n device, a field plated device, a Schottky device, a MOSCAP, and a MOSFET.

49. *(previously added)* The optical device of claim 37, further comprising a channel formed in the waveguide, wherein the waveguide lens focuses light into the channel.

50. *(previously added)* The optical device of claim 37, wherein material removed to form the waveguide lens during said etching does not fully extend through the upper silicon layer.

51. *(previously added)* The optical device of claim 37, wherein the upper silicon layer is less than or equal to 10 microns thick.

52. *(previously added)* An optical device formed at least partially in a wafer, the optical device comprising:

an upper silicon layer formed on the wafer, the upper silicon layer at least partially forming a waveguide; and

a waveguide lens formed in the upper silicon layer, wherein the waveguide lens is formed at least in part by etching the upper silicon layer of the wafer.

53. - 54. *cancelled*

55. *(currently amended)* An optical device formed at least partially in a Silicon-On-Insulator (SOI) wafer comprising a substrate, an insulator layer disposed over said substrate and an upper silicon layer disposed over said insulator layer, the optical device comprising

~~an upper silicon layer formed on the SOI wafer, the upper silicon layer at least partially forming a waveguide~~ formed in a portion of the upper silicon layer;

a glass layer formed across at least part of the upper silicon layer; and

Deliwala 500301D5

a waveguide lens functioning in the upper silicon layer formed at least in party by etching the glass layer.

56. (previously added) An optical device formed at least partially in a wafer, the optical device comprising:

an upper silicon layer formed on the wafer, the upper silicon layer at least partially forming a waveguide;

a glass layer formed across at least part of the upper silicon layer; and

a waveguide lens functioning in the upper silicon layer formed at least in party by etching the glass layer.

57. - 58. cancelled